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ABSTRACT

Literature concerning microcomputer usage in business education programs within secondary schools, teachers' attitudes toward microcomputer use in the classroom, and employment needs of the business community in computer and related occupations was examined. By comparing microcomputer use and employment needs, the study attempted to determine whether the curricula were providing students with the skills that businesses need. The 50 study annotations are divided into three main areas: (1) uses of microcomputers in secondary business education; (2) the knowledge, skill, and attitudes of teachers toward microcomputers and various computing issues; and (3) employment needs of the business community in computer and related occupations. Results indicate that most secondary business education programs were teaching the technological skills that enable students to secure entry-level, computer-oriented jobs in businesses. Cooperative efforts between the private sector and the education community need to be increased in order to provide education for employment. Three recommendations are offered: (1) an employer/school advisory committee should be established for business education curriculum development; (2) business education teachers should update their knowledge and skills in actual office settings; and (3) more IBM and compatible computers should be made available for business education use. (Fifty-five references are included.) (NLA)

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An Annotated Bibliography on Microcomputers in Secondary Business Education: The School-Business Partnership

by

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S591 Research Project in Secondary Education

Indiana University at South Bend

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INTRODUCTION

> One of the most difficult challenges that American schools face is keeping the educational environment relevant to the so-called "real" world--the nonacademic, corporate, and social system structures. The "real" world has been revolutionized by computers which perform information processing and information management (Harmon 1985 13-14).

Computers have changed the way we live, work, and receive our education. Microcomputer technology has affected every office area, and the computer has almost replaced the typewriter as the instrument of information processing and management essential to the world of business. As Conrad reported, the computer has become an integral part of the modern business environment, and an understanding of the applications and uses of computers was an important part of the job skills for office employees (1). According to Barr, jobs were changing, combining computers and bookkeeping or computers and general office work (6).

In order to keep pace with the rapid advances in computer information processing, business education teachers were changing their teaching methods and procedures. They were incorporating microcomputers into their curricula. Accounting operations, office management applications, and word processing were just a few areas of instruction which could be performed by computers. Harmon (April 1986) stated, "microcomputers are more applicable to business education instruction than to other secondary educational areas, as the students are able to see the microcomputer as a medium of instruction and as a working tool to complete the daily business activities" (293).

If our schools are to meet current and future needs, microcomputer usage must occur in business education at all secondary schools. Businesses and schools must work together to provide the most relevant education-for-work

experience possible that will prepare students for jobs in today's marketplace. Therefore, it is this important school-business partnership which will guide the development of business education curriculum to meet the employment needs of the business community.

STATEMENT OF THE PROBLEM

The business education curricula in secondary schools should provide students with the technological skills that businesses need.

STUDY DESIGN AND ORGANIZATION

This study examined the literature concerning microcomputer usage in secondary schools, specifically in business education, as well as teachers' attitudes toward microcomputer use in the classroom. In addition, studies pertaining to the employment needs of the business community in computer and related occupations were examined. Secondary schools were defined as grades 9-12. By comparing microcomputer usage and employment needs, the study attempted to determine whether the business education curricula was providing students with the skills that businesses need.

The study annotations which follow were divided into three main areas. The first area concerned the uses of microcomputers in secondary business education. Information was presented to answer the following questions: What brands of computers were being used? What was the availability and use of computers in business education? What business microcomputer applications were being taught? What business content was being taught using

microcomputers? What teacher-management applications have teachers made use of with microcomputers? The second part focused on the knowledge, skill, and attitudes of teachers toward microcomputers and various computing issues. Part three centered on the employment needs of the business community in computer and related occupations. After the annotations, a summary, conclusions, and recommendations were presented.

LIMITATIONS OF THE STUDY

In searching the literature, it was found that very little research was available to provide specific business education departmental data on microcomputers. Relevant information pertaining to business or office education and vocational education in the studies which reported microcomputer usage in secondary schools was included and was highlighted in the annotations. Time constraints limited the investigation of all related literature, but it is believed that the annotations included are a representative sampling of recent research.

GLOSSARY

BASIC -- "A high-level programming language sometimes used to introduce students to programming. The acronym BASIC stands for Beginner's All-purpose Symbolic Instruction Code." (Brownell 403)

Bogardus social-distance technique -- "when the variable of distance is introduced, the attitudes of people toward things and other people tend to change or differentiate. More simply, the closer something is to 'home,' the more likely one's attitude is to differentiate than if one is simply expressing an attitude toward an abstraction--a nationality (or computers) in general." (Norris and Lumsden 130)

business education -- "that area of education which develops skills, attitudes, and understandings essential for the successful direction of business relationships." (Good 75)

city school district -- "School territory which includes in its boundaries a population of 5,000 or more (Ohio Revised Code, 3311.02)." (Harmon 1985 10)

clerical perception -- "ability to organize information and perceive distinctions in printed matter." (Intensive Business Program Appendix A 6)

COBOL -- "A high-level programming language widely used to write business programs. The acronym COBOL stands for COmmon Business Oriented Language." (Brownell 404)

computer -- "A machine that processes data by performing arithmetic or logical operations on it. A device that accepts input (data), processes it, and provides output (information)." (Brownell 404)

computer-assisted instruction (CAI) -- "An instructional technique based on the two way interaction of a learner and a computer with the objective of human learning and retention." (Educational Technology 324)

computer awareness -- "To be interested in and curious about computers and their uses, and to seek more information about them." (Kuchinskas 205)

computer-based instruction (CBI) -- "A term used to be synonomous with computer-assisted instruction, at least in its tutorial instruction and dialogue forms. In common use, it emphasizes individualization and computer as sole instructor." (Educational Technology 327)

computer language -- "An artificial language concocted for purposes of communication between humans and computer systems." (Kuchinskas 205)

computer literacy -- "A state where an individual understands what a computer is, how it works, and is comfortable and effective in making a computer accomplish a necessary task." (Brownell 404)

computer-managed instruction (CMI) -- "The use of a computer in education, not for instruction, but for recording the progress of a student through a learning sequence." (Educational Technology 327)

computer program -- "The set of instructions a computer is given that causes it to perform a desired task." (Brownell 404)

county schools -- "All territory in a county except for City and Exempted Village school territory (Ohio Revised Code, 3311.05)." (Harmon 1985 11)

courseware -- "The programs used with a microcomputer. This is another term for software." (Kuchinskas 205)

data base -- "A specialized file made up of a collection of records." (Brownell 405)

data base management system -- "Software that manages the data stored in a data base." (Brownell 405)

employability skills -- "basic literacy, work habits and attitudes, interview skills, etc." (South Carolina 15)

exempted village schools -- "School territory which includes in its boundaries a population of 2,500 or more and elects to be exempt from county status (Ohio Revised Code, 3311.08)." (Harmon 1985 11)

hardware -- "Mechanical, magnetic, electrical, and electronic devices which make up a computer. The physical equipment that goes into a computer system, consisting of the central processing unit plus all peripherals." (Douglas and Edwards 124)

"high spending" schools -- "schools that spend more than $60 per student" (Fepe et al. 11)

joint vocational schools -- "A school created by joint effort between City, Exempted Village, and County schools in order to offer vocational instruction (Ohio Revised Code, 3311.16)." (Harmon 1985 12)

"large" schools -- "schools with over 1,000 students" (Fepe et al. 6)

"low spending" schools -- "schools that spend less than $30 per student" (Fepe et al. 11)

metro class -- "urban, suburban and rural" (Fepe et al. 12)

microcomputer -- "A computer which is small and self-contained in a single unit. It is sometimes called a personal computer and is the cheapest computer." (Kuchinskas 209)

micro-intensity -- "The school or district enrollment divided by the number of microcomputers in the school or district. Micro-intensity measures the potential for student access to the microcomputers." (Pepe et al. Appendix D) A lower micro-intensity indicates there are less students per computer.

"poor" schools -- "'Poor' districts . . . have more than 25% of the student population below the federal poverty level." (Pepe et al. 9)

programming language -- "A language in which a computer program (set of instructions) can be written. Examples are Pascal, Logo, BASIC, and COBOL." (Brownell 411)

"rich" schools -- "Federal guidelines can be used to define a 'rich' district as having less than 5% of its student population below the federal poverty level." (Pepe et al. 9)

"small" schools -- "schools with under 200 students" (Pepe et al. 6)

software -- "The computer programs, or instructions, that make the computer perform particular tasks." (Brownell 412)

spreadsheet -- "A method of arranging data in rows and columns in order to more readily understand and work with the data for any of a variety of purposes. Commonly refers to software that provides computerized spreadsheets." (Brownell 412)

vocational education -- "a program of education below college grade organized to prepare the learner for entrance into a particular chosen vocation." (Good 645)

word processing -- "The entry, manipulation, editing and storing of text using a computer." (Kuchinskas 211)

ANNOTATIONS

HOW ARE MICROCOMPUTERS BEING USED IN THE BUSINESS EDUCATION CLASSROOM?

Anderson, Cheryl A., and Richard L. Smith. "Instructional Computing Patterns in Texas Schools: Implications for Teacher Training." AEDS Journal 18.1 (Fall 1984): 1-16.

In the spring of 1983, 200 Texas school districts that were using computers for instruction were surveyed to determine computer usage. Findings showed that computer usage varied across grade spans. By senior high, computers were used most frequently by regular students, followed by gifted and talented, and other. Computer use increased with grade level, to 89% by 12th grade. The major curriculum area where computers were used was math. By senior high, computer use increased in the areas of science and business education. Instructional computer applications differed according to grade span. The applications of instructing with a computer, computer managed instruction and using the computer as a teacher's aid were rated by the majority of teachers as being never or seldom used. By senior high, teaching about computers and problem solving with computers were applications that were frequently or always used. Students were expected to attain a different level of computer literacy skill at each grade span. Respondents indicated that teachers' lack of training was a major barrier to computer use in schools. The researchers suggested specialized training based on the grade level and subject taught.

Barker, Bruce. "The Role of the Microcomputer in Rural Schools." Rural Educator 8.1 (Fall 1986): 1-3.

During the 1983-84 school year, 319 small and 350 large public high schools throughout the United States were surveyed to determine student use of microcomputers. Findings revealed 99% of the schools owned at least one microcomputer. The mean number of microcomputers per school was 9.8 in small schools and 27.2 in large schools. The micro-intensity ratio was 32.2:1 and 59.1:1, respectively. Time allocated for microcomputer instructional activities was 55 minutes per week for each student in small schools and 30 minutes per week in large schools. Microcomputers were used primarily for student instruction, followed by administrative recordkeeping, and word processing by office staff. Business, computer science, and math were the subject areas in which microcomputers were used most often to aid instruction in both samples. Principals in small schools reported that 20% of teachers were "computer literate" (can write programs) and 43% were "computer aware" (cannot write programs), compared to 15% and 36%, respectively, for teachers in large schools. Over 36% of teachers in small schools and 49% in large schools were not familiar with how the computer operates nor did they know how to use it. The study concluded that microcomputer usage was limited by large student-to-computer ratios and lack of qualified teachers.

Becker, Henry J. How Schools Use Microcomputers. Summary of the First National Survey. Baltimore, MD: Center for Social Organization of Schools, The Johns Hopkins University, 1985. (ERIC Document Reproduction Service No. ED 257 448)

During the 1982-83 school year, a national survey of 2,209 U.S. elementary and secondary schools was conducted to determine the schools' instructional uses of microcomputers. Data were collected from principals and primary computer-using teachers. A majority of schools that had microcomputers had fewer than five of them. Secondary schools dominated computer use, where the major uses of microcomputers were: introduction to computers, programming instruction, drill & practice, and business education/vocational. Management uses (eg. teacher tests or worksheets) were reported by 10% of the teachers. BASIC was the predominant programming language. The longer a school had a microcomputer, the more it was used for teaching programming, and the less it was used for drill & practice (elementary and secondary). The median number of minutes per week per student was 45 minutes. The more microcomputers a school had, the more access time per user. Teachers believed that microcomputers had led to increased student enthusiasm for school; to academic learning by "above-average" students; to students working more independently; to students helping each other; and to students doing work more appropriate to their own ability level. Teachers in 1983 felt that microcomputers impacted more on the social organization of learning than on increased student achievement.

Becker, Henry J. "Men and Women as Computer-Using Teachers." Sex Roles 13.3/4 (Aug 1985): 137-48.

Data collected from a national survey of schools found that women were "primary computer-using teachers" (PCUTs) in 44% of the secondary schools sampled. Most men and women teachers use computers primarily as an object of instruction, and secondly, as a tool in math instruction. The major gender distinctions were the predominate use by women PCUTs in business education and the greater number of men PCUTs who reported "computers" as a subject matter for one of their primary uses of microcomputers. Students in schools with a male PCUT used microcomputers for more time during the week, and each student had greater access. Men PCUTs reported more learning by average and above-average students. Schools with men PCUTs had stronger programs with more microcomputer involvement because the men PCUTs had greater personal involvement as computer enthusiasts. Gender differences in computer interest and participation in computer activities (with male dominance) were widespread both among students and teachers. Teachers saw these differences as restricting occupational choices for girls. Women computer-using teachers were important role models for female students to help reduce this differential.

Becker, Henry J. Instructional Uses of School Computers: Reports from the 1985 National Survey. Baltimore, MD: Center for Social Organization of Schools, The Johns Hopkins University, Issue No. 1, June 1986.

During the spring of 1985, more than 10,000 principals and computer-using teachers in more than 2,300 U.S. elementary and secondary schools were surveyed. Almost all secondary schools in the U.S. were using computers for instruction (97% of high schools). For high schools, the median number of computers was 21, and the median **student-computer ratio** was 31:1. Apple II and compatible computers accounted for more than half of the computers used. The median high school student user spent 105 minutes per week at a microcomputer. High school students spent almost half of their computer time programming (49%) and only 16% of their time on CAI (drill & practice). Computer literacy and programming were the major **subjects** for which computers were used, followed by business education and math. Of five curricular areas, only business courses involved more computing activity in classrooms than in labs. Combining four areas of computer-related knowledge (using instructional programs, knowing about a variety of programs, using word-processing or other tools, and writing computer programs), 27% of computer-using high school teachers were rated as "expert".

Becker, Henry J. Instructional Uses of School Computers: Reports from the 1985 National Survey. Baltimore, MD: Center for Social Organization of Schools, The Johns Hopkins University, Issue No. 2, August 1986.

Data collected from a national survey found that the 11th and 12th grades accounted for 60% of high school users and occupied nearly two- thirds of the instructional time on high school computers. The main function of computers in these two grades was as a regular part of instruction (not for enrichment or remediation) of the subject taught. The high school class was most often a class about computers rather than a class using computers as an instructional tool. Boys dominated computer use (before/after school, programming, and game playing), except in high school word-processing. Higher-ability students also dominated computer use, except in game playing. In grades 9-12, 50% of all student computer activity was in computer programming and computer literacy courses, and 19% was spent in business, typing, and word- processing courses. Mixed-ability classes were concentrated in computer programming, business, and word-processing. Teacher computer expertise was greatest at high SES high schools and lowest at high schools in farming communities. More programming activity occurred in schools in metropolitan areas with students from high SES backgrounds.

Conrad, Debra. Using Microcomputers in Vocational Education to Teach Skills Needed in Business and Office. Elkins, WV: Randolph County Board of Education, 1984. (ERIC Document Reproduction Service No. ED 269 598)

The purpose of this project was to determine which software products were currently being used by business and office occupations teachers in West Virginia and to evaluate software available for teaching business and office skills. Ninety-four of 164 teachers responded to Conrad's survey. Conrad summarized the results of 29 programs evaluated by the respondents. She noted that most schools surveyed did not have computers in the business department: the computers were located in math or science departments. She concluded that software purchased and used in the business classroom was limited: most programs were very expensive: most software available provided for instruction in typing/keyboarding, word processing, and accounting: and software companies were slow to deliver. Respondents evaluated the following programs as EXCELLENT: Basic Typing, Basic Information Keyboarding Skills, Superscript II, Structured BASIC Programming, Data Entry, Text Editor, Textpack II, Super Scripsat, and Wordstar-Mail Merge. Conrad personally evaluated 14 additional programs. She recommended: You Decide, Alphabetic Indexing Rules, Structured BASIC Testbank, Personal Investing, Profit and Loss, Personal Checking, and Alphabetic Keyboarding. Conrad recommended teacher training in an actual office to gain first-hand knowledge and hands-on experience with the business work to keep pace with current technology and the changing business world.

Harmon, Gary D. Microcomputer Usage in Secondary Schools Located in the State of Ohio and an Analyses of Business Teachers' Attitudes Towards Microcomputers. Diss. The Ohio State U, 1985.

The purpose of this study was to examine microcomputer usage in secondary business education programs and to examine the relationship among computer usage and various curriculum variables. A random sample of 200 Ohio high schools was surveyed, and 68% responded. Apple was the predominate brand of microcomputer available for instructional use, followed by Radio Shack, and Commodore (secondary schools in general and for bus. ed. use). Word processing, keyboarding, and basic accounting were the applications used most often in business education classrooms; and payroll, taxes, and inventory were used least often. Application software was used more in the classrooms, and programming was taught less. Business education teachers' attitudes were positive toward the use of microcomputers in the classroom. Pre- or in-service training was the primary source of microcomputer knowledge. There was a difference among the teachers' attitudes toward microcomputers, and the specific microcomputer applications used in business education and the classification of school in which they taught.

Harmon, Gary D. "Microcomputers: Purchasing Patterns and Instructional Uses in Secondary Schools." Journal of Education for Business 61.6 (March 1986): 245-48.

A study of 200 Ohio high schools was conducted to examine microcomputer usage in secondary schools with emphasis on **business education**, and 68% responded. Data were collected from the principal and the business education chairperson. Apple microcomputers were the most widely used microcomputer in Ohio secondary schools for instructional use (44.6%), followed by Radio Shack (Tandy) (33.4%), and Commodore (15.4%). Joint Vocational schools had the most microcomputers per school, and Private schools had the least. More microcomputers were housed in labs than in academic departments. In academic departments, business education ranked first, with math second. The overall mean micro-intensity (students per microcomputer) was 55.69; Joint Vocational schools had a lower ratio than other classifications (25.99). Respondents indicated that Apple microcomputers will be purchased in greater quantities than Radio Shack or Commodore for the 1985-86 school year. More than one source will be utilized to fund future computer purchases. Harmon concluded that schools must purchase more computers to lower the micro-intensity ratio to improve student learning.

Harmon, Gary D. "Microcomputers in Business Education: A Look at Public and Private Schools." Journal of Education for Business 61.7 (April 1986): 293-96.

A study of 200 Ohio high schools was conducted to examine microcomputer usage, and 68% responded. Of the microcomputers available for **business education** use, Apple microcomputers were the most widely used (80%), followed by Radio Shack (Tandy) (14%), and Commodore (5%). Joint Vocational schools had the most microcomputers per business department (27), and Exempted Village schools had the least (3). There was no significant difference among public schools nor between public and private schools regarding **microcomputer availability**. Within the business education departments, more than half of the micros were located in labs (54.2%) and one-third in classrooms (33.9%). Public school students spent approximately 60 minutes per week at a microcomputer compared to 45 minutes per week for private school students. The mean micro-intensity ratio for business education was 66.76:1 (overall was 55.69:1). Word processing was the most widely used microcomputer application in business education, followed by keyboarding, and basic accounting. Word processing was used more by public schools than private schools. Harmon stated, "By incorporating these applications, the student will acquire valuable hands-on experience which will help the learner gain suitable employment, providing the employer with well-trained individuals" (p. 296).

Hertz, Daniel G. Articulation Research of Business and Office Education in Montana. Helena, MT: Dept. of Vocational Education Services, Montana State Office of Public Instruction, 1985. (ERIC Document Reproduction Service No. ED 253 741)

During May, 1984, schools in Montana at all levels that offered **business** and office **education** subjects were surveyed to determine what subjects were offered and what major concept/skills were included therein. **Business education** leaders from other states were also surveyed. Recommendations concerning 50 business subjects were requested from 109 **business education** leaders, department chairmen, and teachers; and 66% responded. Leaders recommendations as to subject offerings were in agreement with the teachers for various subjects including: Microcomputers "should be taught" at the senior high school level (95%) and "was taught" by a majority of the senior high schools (68%); and data processing "should be taught" at the senior high school level (100%) but "was not taught" by a majority of the senior high schools (48%). For the subjects microcomputers and data processing, a majority of the leaders and teachers recommended as a major concept/skill developing skill in programming in the BASIC language. Hertz reported that of the 144 junior high and high school **business education** departments surveyed, 77% had microcomputers (junior high=86%; senior high=68%).

Holder, Birdie H. "Expanding Computer Usage in Business Education." Journal of Business Education 59.8 (May 1984): 310-13.

In the spring of 1983, 106 business teachers were surveyed from randomly selected secondary vocational **business education** programs in Nebraska to determine microcomputer availability and usage, and teacher attitudes toward the computer. Of the microcomputers available to **business education** departments, 38 of the programs had from two to four computers, 27 programs had only one computer, and 15 programs reported no computers available in the **business education** classroom. Forty-five percent (45%) of the business teachers had a vocational lab. Of the 77 programs with computers, 37 programs used computers for both administration and instruction, and 40 programs used computers for instructional purposes only. Classroom use of the computer was divided into four areas: testing, recordkeeping, CAI, and computer literacy class. CAI was used most frequently (51 programs), followed by computer literacy class (37 programs), recordkeeping (23 programs), and testing (11 programs). Other uses included career planning, word processing, typing, accounting, and data processing. The ratio of students-to-computer varied greatly, from 5:1 to 50:1 per course; small rural programs had the smaller ratios. Apple II's were used in 81% of the business programs, and Radio Shack (TRS 80) in 21%. Business teachers had very **positive** attitudes toward the computer and desired to learn more about it.

Lambrecht, Judith J. Instructional Microcomputer Applications by Business Teachers in Minnesota. St. Paul, MN: University of Minnesota, Dept. of Vocational and Technical Education, 1986. (ERIC Document Reproduction Service No. ED 266 272)

Data were collected from 255 Minnesota secondary **business** teachers in 207 schools about their instructional microcomputer applications and their attitudes about several instructional computing issues. Apple II was the predominant brand of computer (90%), and IBM (12%). **Business departments** averaged 19 computers. One-third of high school **business department** computers were located in multi-purpose classrooms (averaged 6.5 computers). Business microcomputer applications taught most frequently were word processing, accounting, BASIC programming, spreadsheet, and data base. Computers were infrequently used to teach content or as a teacher-management tool; Lambrecht suggested that low general use may be related to computer availability in multi-purpose classrooms. Content taught most often were accounting and keyboarding; teacher-management tools used most frequently were word processing and spreadsheet. Less than half of the teachers marked any area of instructional computing as one about which they needed more information. Areas of agreement: teachers enjoyed integrating computers into their teaching, but stated lack of time was a problem; business applications software was not too complicated for student use; and knowledge of a programming language by students or business teachers was not necessary for computer literacy. Areas of disagreement: equity in access to computers by teachers and students, software copying, and teacher preparation for using computers in instruction.

Lantz, James. State-of-the-Art Uses of Computers in Vocational Education in Ohio. Columbus, OH: Ohio State Advisory Council for Vocational Education, 1984. (ERIC Document Reproduction Service No. ED 242 873)

The purpose of the study was to provide educators with a guide for state-of-the-art computer uses in **vocational** schools in Ohio. Lantz described one school's Business Office Education (BOE) "state-of-the-art" course for microcomputer accounting. The course was developed based on a market survey and used commercial software and workbooks. A special advisory committee was formed, and teachers participated in the decision to purchase hardware and software. Employers appreciated student training on equipment used in area businesses. Another school proposed a banking program which would use software developed for and used in the industry rather than software that simulated the industry. Also, equipment purchased must be compatible with the software. At this time, finding a match between school computers and industry software was a problem. The study showed that the uses of computers and their potential varied. He concluded that the most successful programs were curricular and instructional programs that were based on documented employment needs in the marketplace and led by strong local advisory committees made up of business and industry leaders. Lantz reported that no significant gap existed between vocational training and entry-level skills required by employers, and that employers expected to train for the job-specific skills.

Lucas, Sam. Computer Utilization in Middle Tennessee High Schools. Paper presented at the Mid-South Educational Research Assoc., Biloxi, MS, November 7, 1985. (ERIC Document Reproduction Service No. ED 266 774)

The purpose of this study was to determine the availability and use of computers in high schools of Middle Tennessee. A total of 50 principals representing 28 school systems were surveyed. Findings showed Radio Shack and Apple were the predominant brands of computers used. The mean number of computers per school was 12.5. The micro-intensity ratio was 66.48:1 (students to computer). The courses where computers were used most frequently as part of instruction were mathematics, computer science, vocational education, and science. Time allocated for computer instructional activities was 30 minutes per week for each student. Computers were used most frequently for instruction in regular classrooms, followed by instruction in computer labs, and enrichment activities. Sixty-eight percent (68%) of the schools taught computer programming. A majority of the schools (60%) perceived an improvement in the quality of instruction as a result of computer use. The computer ranked fourth (behind textbooks, the chalkboard, and the overhead projector) as an effective instructional tool.

Meiss, Jack L. A comparative study of the status of education for business in the public secondary schools of the Commonwealth of Pennsylvania and the state of New Jersey, 1981-1982. Diss. Temple University, 1985.

The purpose of this study was to determine and analyze current practices of business education programs in the public secondary schools of Pennsylvania and New Jersey. The study assessed six areas of business education including nature and scope of offerings, and equipment, facilities, and other resources. Typewriting, shorthand, and accounting/bookkeeping courses were the most common subjects taught. Word processing was the business course most commonly added to the business education curriculum. Computer literacy, keyboarding, and data processing were becoming increasingly popular. Microcomputers were often placed in the math and science departments. The typewriter was the "backbone" of business education programs. Microcomputers were used more than other data processing/computer equipment, but availability was limited. Recommendations were made to require computer literacy and keyboarding courses of all students for graduation; to update equipment to meet advancing technological training and job placement requirements; to purchase more microcomputers to provide students a fundamental knowledge of computer/ information technology for entry-level employment; and to improve articulation between business educators and others.

Farr, Leslee, and Rich Miles. Computers in the Schools: A Follow-Up Report. Medford, OR: Jackson Education Service District, 1985. (ERIC Document Reproduction Service No. 266 777)

In May 1985, 82 schools in Jackson and Josephine Counties (Oregon) were surveyed to determine the current status and use of microcomputers in education. This study updates a similar study reported in 1984. The data showed that the number of microcomputers had increased significantly, from 607 in 1984 to 763 in 1985. Apple was the most common brand used (58%), followed by Commodore (26%) and TRS-80 (Radio Shack) (10%). Forty-nine percent (49%) of the microcomputers were located in computer labs. Seventy-four percent (74%) of the teachers reported that they could load and run a computer program. Teachers used computers primarily for instruction, word processing, and personal use. At the secondary level, the prominent form of CAI was drill & practice, with programming second. BASIC was the primary computer language taught. At the secondary level, business students spent 2 hours and 45 minutes per week on computers compared to an average of 1 hour and 35 minutes per week for all students. Overall, the curriculum area in which microcomputers were most used was math; business ranked seventh. Teachers indicated three areas of training needs: computer literacy, "hands-on" experience, and software evaluation.

Pepe, John and Others. Microcomputers in Schools, 1983-84: A Comprehensive Survey and Analysis. Westport, CT: Market Data Retrieval, 1984.

Market Data Retrieval conducted a national survey of all public schools during the three-year period 1981-1983 to assess microcomputer availability and usage. As of the Fall of 1983, it was projected that there were 325,000 microcomputers in 55,765 schools. The grade range of the school influenced computer usage; in all three years, senior high schools dominated computer use. High schools, large schools, "rich" schools, "high spending" schools, and suburban schools all showed higher microcomputer usage than elementary schools, small schools, "poor" schools, "low spending" schools, and rural or urban schools. High schools, small schools, "rich" schools, "high spending" schools, and rural schools had a better micro-intensity ratio than elementary schools, large schools, "poor" schools, "low spending" schools, and urban and suburban schools. For high schools, the average micro-intensity ratio was 75.2:1; the national average was 92.3 for all schools. Indiana ranked 23rd for micro-intensity with 83.8 for all schools, and 71.6 for senior high schools. Apple microcomputers were the most widely used (49.4%), followed by Radio Shack (21.0%), and Commodore (15.2%).

Rauch, Verda. "Microcomputers in Business Education Today." The Balance Sheet 66.4 (1985): 4-7.

Data were collected from 67 responding schools within the National **Business Education** Association's Mountain-Plains Region, a nine-state area, to determine microcomputer usage in **business education.** This study showed that 91% of the schools used microcomputers in **business education** classes. Microcomputers were used most often in accounting and office procedures, followed by data processing and typewriting. Few schools required a keyboarding/typewriting course before using the computer. Computer literacy courses were taught in 60 of the schools and by both the **business education** and math departments. The main objectives of the course were computer knowledge and application. Microcomputers were used to teach word processing in 80% of the schools; instruction was usually a part of office procedures or office machines courses. Microcomputers were located primarily in **business education** or math departments. Apple microcomputers were the most widely used, followed by Radio Shack (TRS 80), and Commodore.

Swadener, Marc, and Karen Jarrett. "Computer Use in Content Areas in Secondary Schools." Journal of Computers in Mathematics and Science Teaching 6 (Winter 1986-87): 12-14+.

The purpose of the study was to determine the degree to which computers were used in non-computer classes in secondary schools. Data were collected from urban and suburban schools and school districts in a large metropolitan area in Colorado. Schools typically had 15 or more computers available. Apple II computers were the most widely used, followed by IBM-PC/PC Juniors, and Macintosh. The predominate use of computers in secondary schools was by computer classes, primarily in computer labs. Accessibility was a problem for non-computer classes. The number of "applications" classes was small. Teachers of non- computer classes used computers as an instructional tool very little, except for word processing. Other applications software, such as data base systems and spreadsheets, were not used in regular classrooms. Instructional software, such as drill & practice, tutorials, and simulations, were used. **Business departments** used computers for teaching typing but for few other applications. **Business** and English **departments** were the most frequent users of computers in regular class settings. Teacher training and availability of hardware and software were the major problems to incorporating computers into non-computer classes.

Wepner, Shelley B. Educational Computing in New Jersey: A Status Report. Wayne, NJ: Dept. of Curriculum and Instruction, William Paterson College, 1986. (ERIC Document Reproduction Service No. 270 078)

Educators from 26 school districts in four counties in northern New Jersey were surveyed to determine the status of computer inservice training and computer usage. The sample included elementary teachers, middle/junior high teachers, and content or special area teachers. Findings indicated a majority of the respondents (51%) had not had any coursework with computers. Of those who had taken courses, the courses most often cited, in descending order, were: overview of computers, Logo, BASIC, and word processing. Only 23% stated that they had one computer in their classrooms; 11% had more than one. Apple was the predominant brand of computer used, followed by Commodore, and Radio Shack. Computer availability was more prevalent in labs than in classrooms. Computers were used most frequently for: computer awareness, drill & practice/tutorial, and BASIC programming. Computers were used infrequently for: spreadsheets, data base management, and PASCAL. Eighty-one percent (81%) of the respondents indicated that they were interested in taking courses in computer education. Their interests in future computer coursework paralleled current computer usage in schools and included: computer software (curriculum integration and instructional design), word processing, BASIC programming, computer graphics, and computer networks.

WHAT ARE THE KNOWLEDGE, SKILL, AND ATTITUDES OF TEACHERS ABOUT MICROCOMPUTERS AND VARIOUS INSTRUCTIONAL COMPUTING ISSUES?

A Teacher Survey NEA Report: Computers in the Classroom. Washington, DC: National Education Association, Research Div., 1983. (ERIC Document Reproduction Service No. 229 343).

A national sample of 1,700 elementary and secondary school teachers were surveyed to gather information about their knowledge, skill, and attitudes toward computers. Teachers reported they were **not** well informed about any computer knowledge or skill area surveyed. Almost 79.2% of all teachers had **not** been trained to use a computer. Teachers were interested in learning about computer instructional applications (for enrichment and for maintaining student records) (59.1%), how to operate a computer (58.8%), and how to write computer programs (56.6%). Teachers believed there would be an increased demand for teachers with computer skills (63.2%), learning by computers in (51.4%) and out (49.7%) of school would become common practice, and computer skills would be regarded as a basic form of knowledge (49.3%). Most teachers (70%) believed computers had a **positive** effect on student motivation, subject interest, attention span, self-confidence, and cognitive learning. Teachers believed computers had a **positive** effect on their professional development (66.4%), teaching effectiveness (60.7%), and job satisfaction (47.1%). In general, teachers' greatest needs were for computer knowledge and experience. Among computer-using teachers, the greatest needs were for software (42.2%), personal knowledge about computing (28.1%), and more hardware (21.9%).

Becker, Henry J. Instructional Uses of School Computers: Reports from the 1985 National Survey. Baltimore, MD: Center for Social Organization of Schools, The Johns Hopkins University, Issue No. 3, Nov. 1986.

This study examined teachers' perceptions of the effects of computer use on students and on teachers. Computer-using teachers were enthusiastic about using computers and saw "much improved" outcomes in student motivation, student cooperation and independence, and opportunities for high- and low-ability students. Outcomes with the least perceived improvement were individualization of assignments, diagnoses of students' learning problems, and learning in school subjects by average and above-average students. Learning outcomes were viewed most positively in schools emphasizing word-processing, and outcomes were stronger in schools with better student-to-computer ratios. Twenty-one percent (21%) of business education teachers indicated improvements in student writing because of computers. At high schools, learning **about** computers and programming were believed to be the best uses of computers (not for basic skills or as an application tool). High school business teachers reported that computers had **increased** their use of peer tutoring (50%), within-class grouping (24%), and seatwork (28%), and **decreased** their use of whole-class instruction (21%). The most widespread perception among teachers was that computers had improved the climate for learning by increasing student motivation.

Bliss, Joan, Peter Chandra, and Margaret Cox. "The Introduction of Computers into a School." Computers and Education 10.1 (1986): 49-54.

This study examined teachers' views and opinions toward computers in general and in their teaching. Fifteen (15) teachers within five departments were surveyed as part of a case study on the introduction of microcomputers into a secondary school in England. Findings showed that although the attitude of the majority of teachers toward computers in general was **positive**, more than half expressed worries or criticisms. Teachers were **concerned** about the confidentiality of and access to personal data, abuse of power, and anxieties and feelings of inadequacy toward the new technology. While all the teachers believed that the use of computers as a teaching method would change their role, the majority saw this change as **unfavorable**. Teachers indicated the following **advantages** toward the use of computers in their teaching: useful visual aid for difficult concepts, statistical tools, means for reinforcing learning, motivational tool, and promotes individual learning. Teacher **reservations** included: quality and availability of educational software, problems of infrequency of use, used only for games-playing, and limited access by less-able students.

Cicchelli, Terry, and Richard Baecher. "Microcomputers in the Classroom: Focusing on Teacher Concerns." Educational Research Quarterly 13.1 (1989): 37-46.

This study examined teachers' concerns about using microcomputers in the classroom. Seventy-eight (78) teachers (24 elementary, 7 junior high, and 47 high school) from a semi-urban district outside a large metropolitan city completed the **Stages of Concern Questionnaire.** The study showed that teacher concerns (about an innovation) developed in an hierarchical order, starting with **self**, moving on to **task**, and finally to **impact** of their teaching on students. Stages 0, 1 and 2 (Awareness, Informational, and Personal) were the highest stages of concern in intensity, and Stages 4, 5 and 6 (Consequence, Collaboration, and Refocusing) were the lower intensity concerns. The concern profiles showed that teachers were **aware** of and concerned about the implementation of computers and were interested in acquiring more knowledge (**information**) about the computer. The teachers were **not** greatly concerned about the **management** aspect of computers nor the **consequences** of computers with regard to their students. There were nonsignificant differences in concerns among the three sub-groups. The data suggested that appropriately designed inservice activities specifically matched to these concern areas and presented in a logical progression may reduce teacher resistance to incorporating microcomputers in the classroom.

D'Souza, Patricia V., and Carolena L. Smith. "Attitudinal Study of Implementing Microcomputer Instruction into the Curriculum." Journal of Education for Business 61 (1985): 122-24.

This study examined the influence of microcomputer inservice activities and the implications on vocational teachers' perceptions of microcomputer use in the educational process. During the summer of 1983, 20 vocational teachers from various vocational programs participated in a workshop in Springfield, Ohio. Prior to the workshop, teachers completed a microcomputer instruction attitude questionnaire. Then, teachers participated in a one-week workshop to obtain knowledge on the use of microcomputers as an instructional tool. Teachers completed the same attitude questionnaire at the end of the workshop. The findings of the study indicated that there was a statistically significant change in attitudes toward the use of microcomputer instruction as a result of participating in microcomputer workshops. "The attitudes toward microcomputer use in the classroom were more favorable after the workshop experience" (123). Interaction of the workshop experience with the variables age, educational level, previous use of microcomputers, sex, position, vocational program, and instructional facilities were **not** significant. D'Souza and Smith concluded that microcomputer inservice workshops can be a source for teachers to obtain knowledge on the use of microcomputer activities in the classroom, and can influence vocational teachers' attitudes on the use of microcomputers in education.

Elliott, Peggy G., Gary M. Ingersoll, and Carl B. Smith. "Trends and Attitudes in the Use of Educational Media and Materials." Educational Technology 24.4 (1984): 19-24.

This study examined administrator and teacher attitudes toward and trends in their use of various types of instructional materials, including microcomputers. A variety of schools, levels of instruction, and geographic areas were included to approximate a national sample. All subject areas taught and all ability levels of students were represented. The findings showed teachers were interested in the new technologies but expressed concern about their roles relative to them. In general, there was a **positive** acceptance of the new technology and its inevitability. Suggestions for improvement made by the teachers were to program computers so that slower students may also have access, and to provide computer programs that would allow teachers to access needed drills and receive a reproducible printout. Teachers **rated** "microcomputers" as: not readily available, good, efficient, clean, expensive, modern, easy to use, sturdy, and fairly complex. The longer the teaching experience, the more favorable teachers rated microcomputers. Middle and high school teachers were especially interested in them. The research concluded that significant inservice training would be required before microcomputers were widely accepted by teachers.

Goddard, William F., and Lionel Pereira-Mendoza. "Three Perspectives for Computer Applications in Education." AEDS Journal 17.3 (Spring 1984): 14-19.

The researchers compiled three independent studies of educators' perspectives on computing. The **Field Study** surveyed 434 teachers to assess their experience, knowledge, skill, and attitudes toward computers. The findings indicated a diversity of teachers' opinions regarding the benefits of the microcomputer in their classrooms, including: allow faster students to go ahead, maintain records, provide subject information, and increase student interest. Academic background, number of computer courses taken, sex, and subject taught did **not** influence teachers' perceptions. Only 85 teachers reported having taken at least one computer course, while 349 had taken none. The **Field** data showed that the availability of a computer in the school had a **positive** effect on teachers' perceptions of its role. The **Workshop Study** surveyed 278 teachers after a one hour introductory workshop to obtain their views on educational applications of the computer. Teachers suggested the use of a variety of software, ranging from highly creative and open-ended to highly structured; and the use of simulation and tutorial modes as opposed to drill & practice. Responses were **not** a function of grade or subject taught. **Field** and **Workshop** data supported the conclusion that "the subject taught was not an important factor in determining perceptions" (17). Also, sex, grade taught, and academic background were **not** major factors.

Harmon, Gary D. "Teachers' Attitudes toward Microcomputers as a Teaching Tool." Journal of Education for Business. 61.8 (May 1986): 341-44.

This study examined teachers' attitudes toward the use of microcomputers in business education. Overall, the attitude of business educators was **positive**. Joint Vocational business education teachers were the most positive, and County business education teachers were the least positive. Teachers **agreed** or **strongly agreed** that they were apprehensive about incorporating microcomputers into the classroom; that they needed to learn more about microcomputer instruction and its potentialities; and that there were other benefits of microcomputer instruction, such as increased computer literacy and reduced apprehension. They **agreed less** that they were comfortable working with microcomputers. Teachers were very **positive** that business education programs "should" be improved by the use of microcomputers; however, their attitude decreased as the statement became more restrictive (replacing "should" with "will"). Teachers were **uncertain** whether they must know at least one computer programming language. Business teachers were using **more** software packages and teaching **less** programming. Harmon concluded that business teachers' needs must be considered by teacher educators; that needs directly affect the attitudes of teachers; and that teachers' attitudes must be considered when planning inservice training and seminars.

Ingersoll, Gary M., Carl B. Smith, and Peggy Elliott. "Attitudes of Teachers and Reported Availability of Microcomputers in American Schools." International Journal of Instructional Media 11.1 (1983-84): 27-37.

Data were collected from a national sample of teachers and administrators to assess microcomputer availability for instructional purposes and attitudes held toward their present and future uses. It was estimated that there were 131,000 microcomputers in 25,350 schools nationally in the spring of 1982. Secondary schools dominated microcomputer usage. The findings showed teachers' attitudes were **positive** toward microcomputers in the classroom. Teachers felt that the most important factors of using microcomputers were the motivational aspects and computers' patience and flexibility as instructional aids. Cost was the major drawback of computers as perceived by teachers. Additional concerns of computer use included availability of computers, appropriateness and quality of software, little opportunity for critical or creative thinking, may reduce employment opportunities, and lack of human contact between teacher and student. Teachers believed that human interaction was at the heart of school learning and that computer use could reduce that interaction. Teachers expressed the need for extensive training before they could effectively utilize this new technology.

Norris, Cathleen M., and Barry Lumsden. "Functional Distance and the Attitudes of Educators Toward Computers." T.H.E. Journal 11.4 (January 1984): 129-32.

Over 450 public school educators in Denton, Texas, were surveyed to examine the role of functional distance in the attitudes educators had toward computers. The questionnaire contained three attitude statements, which represented varying degrees of functional distance between computers and the educators surveyed. The majority of educators agreed that "computers are valuable tools that can be used to improve the quality of education" (85.5%), and that "teachers should know how to use computers in their classrooms" (81.4%). However, agreement among educators dropped significantly with the statement "I would like to have a computer for use in my classroom" (66.2%). Educators' attitudes were positive toward computers as long as the function of the computers was removed from their own classrooms. Therefore, the functional distance of the computers determined the educators' attitudes. Norris and Lumsden suggested that administrators who want to implement computers in classrooms must consider teacher attitudes toward educational computing prior to implementation. The procedure used in this study was an adaptation of the Bogardus social-distance technique.

Stevens, Dorothy Jo. "Educators' Perceptions of Computers In Education: 1979 and 1981." AEDS Journal 16.1 (Fall 1982): 1-15.

This study examined the knowledge and attitudes of 1,200 Nebraska K-12 teachers about computers in education. The study showed teachers surveyed in 1981 were significantly more knowledgeable about computer usage and about computers (general computer knowledge, software, and hardware) than those teachers surveyed in 1979. There were no significant changes in attitudes toward computers in education between 1979 and 1981. Teachers strongly advocated that high school students acquire computer literacy skills. Although teachers indicated a lack of skills required to teach computer literacy or to use computers as instructional tools, they expressed a strong desire to acquire the computer knowledge necessary to meet the technological needs of students. More teachers in 1981 than in 1979 believed computers were advantageous and beneficial for students in almost all subject areas. In 1981 teachers were less anxious about computers than in 1979. Stevens identified three major obstacles in the implementation of computers in education: hardware, software, and knowledgeable teachers. Stevens concluded that there was an overall general growth from 1979 to 1981 among teachers of attitudes and knowledge of computers in education.

Stevens, Dorothy Jo. "Microcomputers: An Educational Challenge." Computers and Education 8.2 (1984): 263-67.

A survey of 238 Nebraska K-12 educators was conducted to determine their present perceptions and future expectations of the role of computers in education and their knowledge about computers. The study found that the present usage of computers in schools was very limited, although more than one-fourth of the schools had at least one microcomputer. Educators expected computer usage in classrooms (CAI, CMI, computer science) to increase significantly over the next 10-15 years. Educators perceived that computers would have a strong impact on classroom instruction and on the curriculum; however, they were **not** positive about the future uses of computers in their **own** classrooms. Educators anticipated that computers would cause little change in their classroom procedure (ie. classroom management, record keeping, attendance), instructional strategies (ie. lecture, small group), or in the content taught (ie. topics added, deleted). Educators agreed that computer-assisted instruction was not for all students, subjects, or teachers. Of those surveyed, 72% indicated a need for computer training.

Tesclowski, Dennis G., and Gene L. Roth. Identification, Verification, and Importance of Competencies for Applying the Microcomputer in Vocational Education. Paper presented at the American Vocational Assoc. Convention, Atlanta, GA, December 6-10, 1985. (ERIC Document Reproduction Service No. ED 264 392)

The purpose of this study was to identify, verify, and determine the importance of competencies, and their categories, which will assist vocational educators in applying microcomputers in their programs. The study resulted in a chart called the **Vocational Teacher Competency Profile for Microcomputer Applications.** Forty-seven (47) competencies, grouped within 5 categories, were **identified, verified,** and rated as to **importance** by vocational educators considered "expert" in using microcomputers. Based on the findings of the study, **every** competency and category on the profile was considered **important** to applying microcomputers in vocational education. The overall mean **importance** of each competency and category was 3.99 on a 5-point scale. The **most important competencies** were: select appropriate software for instructional purposes (4.61), orient students to CBI (4.43), and identify job-specific applications of microcomputers (4.42). The **least important competencies** were: develop software for instructional purposes (3.38), maintain attendance records (3.39), and maintain classroom rosters (3.44). Vocational educators were most concerned with the implementation of CBI and applying rather than developing software for instructional and classroom management activities. They were **not** interested in using CBI for classroom management functions.

Tesolowski, Dennis G., and Gene L. Roth. A Comparison of the Importance of Competencies for Applying Microcomputers in Vocational Education. Paper presented at the American Educational Research Association, San Francisco, CA, April 16-20, 1986. (ERIC Document Reproduction Service No. ED 270 631)

The purpose of this study was to determine whether or not educators, representing six vocational program areas, and members of the DACUM (Developing A CurriculUM) panel differed in their perceptions about the importance of competencies and categories on the **Vocational Teacher Competency Profile for Microcomputer Applications.** Findings indicated that the 7 groups did **not** differ on any of 5 **categories.** However, there were significant group differences on 5 of the 47 **competencies:** (1) define the instructor's role in computer-based instruction (CBI), (2) demonstrate an awareness of microcomputer software, (3) assess students' needs for CBI applications, (4) orient students to CBI, and (5) assess students' microcomputer skills. Overall, health, business, and marketing and distribution teachers placed the highest level of importance on the five competencies; and home economics, agriculture, and trade and industrial teachers placed the least importance on them. The DACUM panel was in the middle of the seven groups.

Yuen, Chi-Yuen. An Analysis of Vocational Teachers' Understandings of and Attitudes toward Using Microcomputers in Vocational Education, Final Report. Dept. of Voc. Ed., Pennsylvania State Univ., 1984. (ERIC Document Reproduction Service No. ED 241 744)

This study examined the understandings and attitudes of 273 Pennsylvania vocational teachers about microcomputers and about their use in vocational education. Findings indicated vocational teachers had a low level of knowledge about microcomputers, but they had a **positive** attitude toward using microcomputers in vocational education. Teachers' attitudes toward the use of microcomputers were related to their understandings about microcomputers: the better the understandings, the more favorable their attitudes were toward using microcomputers in vocational education. The teachers' understandings and attitudes were **positively** correlated with educational level, microcomputer experience, training, utilization, and availability. Age and service area showed **negative** relationships. Attitudes differed by age; the younger the age, the more positive the attitude. Understandings and attitudes differed by service area: business occupations teachers demonstrated the highest level of understanding about microcomputers and showed the highest positive attitudes. Yuen recommended that more workshops and inservice training programs should be developed to increase vocational teachers' knowledge about microcomputers (94).

Yuen, Steve Chi-Yin. "A Survey of Teacher Attitudes and Beliefs Related to the Use of Microcomputers in Vocational Education." Trade and Industrial Education Research Committee, Proceedings of the Carrousel Session, American Vocational Association (Dallas, TX, Dec. 8, 1986). (ERIC Document Reproduction Service No. ED 275 885)

During the 1985-86 school year, 125 Mississippi vocational teachers were surveyed to assess their knowledge, skill, and attitudes toward microcomputers. Vocational teachers reported they were somewhat informed about any computer knowledge or skill area surveyed. Fifty-four percent (54%) of the teachers had received some computer training. Teachers were interested in learning about computer application programs (for computer literacy and for maintaining student records) (54.4%), how to operate a microcomputer (54.4%), and how to write computer programs (48.8%). Vocational teachers believed there would be an increased demand for teachers with computer skills (64.8%), learning by microcomputers in school would become common practice (60.8%), and schools without a computer curriculum would be regarded as inadequate (56.8%). Most teachers (70%) believed computers had a **positive** effect on student motivation, self-confidence, subject interest, attention span, and cognitive learning. Two-thirds (67%) of the teachers indicated **positive** attitudes toward computers. Vocational teachers viewed microcomputers as having a **positive** effect on their professional development (65.6%), teaching effectiveness (64%), and job satisfaction (57.6%). Teachers greatest needs were for software or courseware (50%), personal knowledge about computing (22.2%), and more hardware (20.8%).

WHAT ARE THE EMPLOYMENT NEEDS OF THE BUSINESS COMMUNITY IN COMPUTER AND RELATED OCCUPATIONS?

Barr, Lowell L., and Patricia Fairchild. Basic Entry-Level Competencies Needed for Employment, Final Report. Cheyenne, WY: Wyoming State Board for Vocational and Technical Education, 1984. (ERIC Document Reproduction Service No. ED 250 569)

This study surveyed 210 businesses across Wyoming about the job skills needed by persons graduating from high school and immediately entering the work force in office occupations. Computer and related occupations accounted for only 6% of the positions held by respondents. It was noted that jobs were changing, combining computers and bookkeeping or computers and general office work. Entry-level skills in 14 competency areas were rated. For computer and related occupations, the most **required** skills included typing, records management, information processing, organization/time management, grooming/health, written/oral communication, and human relations. Reprographic, telephone, math and calculator, and business knowledge were **desired** skills. The most **unnecessary** skills were accounting/bookkeeping, mailing, and shorthand. The researchers recommended that keyboarding/typing classes should be made available to **all** students; and that computer literacy, word processing, and computer-based accounting should be made a part of every business education program. They also recommended the "cluster" concept of education, where educators prepare students for a variety of entry-level jobs and not specifically for an occupation.

Chaney, Lillian H. and Joseph Clair Otto. "Action Research in Business Education: 'Are Schools Meeting Needs of the Business Community?'" Business Education Forum 42.5 (1988): 23-29.

The purpose of this study was to determine if the employment needs of the business community are being met by the business curriculum in secondary schools, and to answer the question are the schools teaching the technological skills that businesses need? Chaney and Otto surveyed 69 secondary schools and 168 business firms in the Mid-South to determine the status of computer education and utilization. Chaney and Otto concluded that most schools in the Mid-South were teaching the technological skills necessary for students to secure entry-level computer-oriented jobs in today's businesses. Areas of agreement included: Businesses use computers; schools offer computer- related courses. Businesses use programming languages; schools teach programming. Businesses use a variety of software; schools teach various software packages. Software reported most frequently by secondary schools included: Apple Writer, Supercripsit, WordStar, dBase, and PFS-Write. Businesses require keyboarding for many data-entry positions; most schools require keyboarding skill. Areas of disagreement included: Most businesses use COBOL; most schools teach BASIC. Most businesses use IBM computers; most schools use Apple computers.

Crowe, Jacquelyn. Identify Skills and Proficiency Levels Necessary for Entry-Level Employment for All Vocational Programs Using Computers to Process Data, Final Report. Olympia, WA: Washington State Commission for Vocational Education, 1985. (ERIC Document Reproduction Service No. 254 675)

The study investigated computer and word processing operator skills and proficiency levels necessary for entry-level employment in the field of automated information processing. An employer survey was conducted of businesses from 16 different industries in four geographic locations in the state of Washington. For data entry operators, the majority of employers required minimum proficiency rates of 10,000 keystrokes per hour with an error rate of 1. For word processing operators, company proficiency levels were between 50 and 65 words per minute with an error rate of 5. Word processing and accounting were the most frequent uses of computer applications by entry-level employees, followed by spreadsheet, and payroll. Lotus 1-2-3, Word Star, and Multiplan were the application software packages most often used. Respondents rated the following skills, in order of importance: task performance, communicating with others, preparing documents, sending and receiving documents, maintaining equipment, managing records, and using equipment.

Fairchild, Patricia, and Joyce Gilligan. Wyoming Business and Office Occupations Survey for Entry-Level Employment Competencies. Cheyenne, WY: Vocational Programs Unit, State Dept. of Education, 1982. (ERIC Document Reproduction Service No. ED 239 039)

A study was conducted to facilitate the determination of business and office education standards for Wyoming. Surveys were returned by 109 businesses. The businesses where asked to place their office positions in four professional areas (specialized office employees, general office employees, bookkeeping/accounting positions, and computer and related positions), and to indicate the degree of need (required, desired, or unnecessary) for entry-level skills in 16 competency areas. For computer and related positions, the most **required** skills included data processing, word processing, written communication skills, recording, filing, and records management skills, telephone skills, mailing skills, and good grooming. Human relations skills, business knowledge skills, and leadership skills were **desired** skills. The most **unnecessary** skills were shorthand and reprographics. The remaining areas were evenly divided between required, desired, and unnecessary. The most often used computer language was BASIC.

Goldstein, Harold, and Bryna Shore Fraser. Training for Work in the Computer Age: How Workers Who Use Computers Get Their Training. Washington, DC: National Commission for Employment Policy, 1985. (ERIC Document Reproduction Service No. ED 263 314)

Data were collected from a total of 196 employers, workers, schools and others on the training required by people who work with computers. The study showed that one in eight workers used computers as of 1982. Of those computer users, about 5% were in occupations that required extensive computer training. The rest of the workers involved with computers used them as tools in their jobs. Between 5% and 10% of computer users needed to learn programming; and the rest operated computers with available software. The researchers concluded that computer programming instruction could only be justified on general education grounds. **Word processing** was identified as one computer-related skill that schools were currently teaching effectively which could enhance a worker's employability. Two points mentioned frequently were: the computer skills in any occupation were only a small part of the total work skills; and hands-on practice was essential in learning computer operating and programming skills. The researchers concluded that although computer use was widespread and growing rapidly, few workers needed extensive education or training in computer-related skills; most learned their skills in brief on-the-job training.

Intensive Business Program. Final Report. Norwalk, CT: Cooperative Educational Services, 1985. (ERIC Document Reproduction Service No. 261 232)

Data were collected from employers in Southwestern Connecticut to assess the overall need for administrative support personnel and to identify the specific skills most needed by persons filling such positions. The results showed that a supply/demand deficit existed for entry-level business and office positions; the most critical need was for persons with secretarial/clerical/word processing skills. The most common type of administrative support job was secretarial. Specialized occupations, such as computer operators, were growing in number. However, keypunch operator jobs were declining. Less specialization resulted as the computer took over the more routine duties. Computer functions appeared to be merging, such as computer operators with word processors. The basic competencies included job related aptitudes (clerical perception, verbal and numerical ability), academic competencies, and technological literacy. Computer literacy was identified by employers as a desirable pre-employment skill. Employers' expectations for attitudinal/behavioral competencies included good social skills or work habits, and a positive attitude. The study concluded that secretaries should be trained as "generalists" with a variety of skills, and that "specialized training" should be oriented toward computer and financial records occupations.

Martin, Julia H., and Donna J. Tolson. Changing Job Skills in Virginia. The Employer's View. Richmond, VA: Virginia Occupational Information Coordinating Committee, 1985. (ERIC Document Reproduction Service No. 269 620)

The study surveyed 115 employers in Virginia to determine changing job skills and training. Six interrelated trends were identified: (1) required skills were becoming more technical; (2) computers were an important tool; (3) occupations were becoming more specialized; (4) teamwork was becoming more important; (5) employers were becoming more customer oriented; and (6) rate of change was rapid. These trends produced changing skill requirements in four areas. Basic skills were expanded to include emphasis on reading, understanding, and applying technical materials, and on oral and written communication. Interpersonal skills were needed for teamwork and for company image. Computer skills were needed to integrate the computer creatively and efficiently. Reasoning, generalizing, adaptability, and flexibility skills were needed to help employees to generalize their knowledge as broadly as possible. These skills were important in all the occupations studied. The researchers recommended that basic skills, computer skills, reasoning and logic, and interpersonal skills should be taught to all students at all educational levels. Overall, employers were satisfied with the quality of the job applicant pool. They wanted good, solid workers, trained in basic skills and computer skills, who could take advantage of specialized on-the-job training.

Mott, Ruth M. The Relationship of Postsecondary Vocational Business School Secretarial Curriculum to the Skill Requirements of Local Major Secretarial Employers. Harrisburg: Penn. State Dept. of Education, 1988.(ERIC Document Reproduction Service No. ED 300 552)

This study examined the secretarial skill requirements of employers in the Harrisburg, Pennsylvania, area. The results of the employer survey showed that all employers required word processing skills, and most required computer skills in varying degrees. For specific computer skills, 50% of the employers required a high degree of proficiency for entry of data, and 50% required an average degree of proficiency for this skill. Sixty percent (60%) of the employers required average proficiency for the manipulation of data, and 40% required high proficiency. Seventy percent (70%) of the employers required average proficiency regarding knowledge of programs, with 10% requiring high proficiency, 10% requiring low proficiency, and 10% requiring no proficiency. Lotus 1-2-3, dBase, and Displaywrite were the most frequently used computer programs by secretarial employees. Other skills employers wanted included telephone commununication, business English and math, and interpersonal competence. Employers also desired a positive attitude. Mott recommended teaching general theory, basic concepts of computers and applications, not specific hardware and software. Specifics could be taught on-the-job.

Owens, Thomas R. Survey Findings of Oregon Employers' Attitudes Regarding Vocational Education and Employment Training Programs. Portland, OR: Northwest Regional Educational Lab, 1984. (ERIC Document Reproduction Service No. ED 241 713)

A statewide study of 1,547 Oregon employers was conducted during 1983 to determine employer attitudes toward vocational education and employment and training needs. Findings showed that employers were most satisfied with new employees who had vocational training from community colleges and apprenticeship programs, and less satisfied with employees who had training from high schools and private vocational schools. Most of the employers indicated that employees who had received high school vocational training in specific job-related skills were proficient in those areas. However, they had trouble generalizing those skills to other tasks. Common problems of new employees most frequently reported by employers were a lack of acceptable work values, habits, and attitudes, weaknesses in the basic skills, and a lack of understanding about the world of business. The employers felt that vocational students needed additional training in computer literacy, basic economics, communication skills, and time management. All employers felt that high schools should provide the "basic skills" and computer literacy, and that employers should provide training in the "specific technical skills" to do the job.

Stevenson, Bill, and Ellen Bowers. Qualities Employers Seek in Employees. Columbus, OH: Ohio State Advisory Council for Vocational Education, 1986. (ERIC Document Reproduction Service No. ED 277 827)

Data were collected from 60 companies throughout Ohio to determine what qualities employers seek when hiring entry-level workers. The study found that the most "essential" employee qualities were **skills of the job** and a **positive work attitude. Basic academic skills** were considered important but only as required to perform on the job. **Communication skills, people skills, appearance, and personal life skills** were considered "advantageous" but not "essential" by more than half of the employers. Employers stated that the "company will train" in the areas of computer literacy and specific job skills. **Computer literacy** was rated "company will train" by 40% and "not used on job" by 40%. **Computer literacy** was **not** ranked No. 1 "essential" by any of these employers, and was the only quality studied for which a number of employers stated that it was "not used on the job." Recommendations for vocational education training were made to promote a positive attitude, to provide up-to-date job skills training, to ensure basic academic skills, and to provide training and experience in job-seeking skills.

Ward, Mary, and Warren Wolff. An Assessment and Projection of Needed High Technology Training Programs in Colorado. Executive Summary. Boulder, CO: Western Occupational Research Corp., 1984. (ERIC Document Reproduction Service No. ED 253 740)

This study examined the labor market needs of 127 high technology firms in Colorado in relation to current and projected completers of vocational education programs. The results of this study indicated a greater need for technical and support personnel than was currently supplied through vocational education programs. Clerical occupations were the third largest area of need, behind engineering technicians and assemblers by high tech firms in Colorado. The study found that entry-level employees were lacking in **basic skills**; firms did not want to be responsible for basic skills training. **Technical skills** of vocationally trained workers were considered acceptable; most firms indicated they would train for job specific skills. Good **employability skills**, as well as technical skills, were considered necessary for successful employment. For clerical programs, demand for administrative support personnel was greater than supply. Firms recommended that training programs should include basic skill competencies, basic clerical skills, employability skills, word processing, and computer literacy. For computer literacy, an operational understanding of computers (applications) was considered essential to technical skills training.

What Employers Say About Vocational Education in South Carolina. A Study of Vocational Education, Report #5. Columbia, SC: South Carolina State Council on Vocational and Technical Education, 1986. (ERIC Document Reproduction Service No. ED 290 923)

In 1985 a survey of 1,245 employers in various industries in South Carolina was conducted to obtain information regarding hiring and training practices, expectations, and perceptions as they relate to vocational education programs at the high school level. Over 31% of the employers said they were not getting enough qualified applicants for entry-level positions. The need for pre-employment training of workers varied by industry; secretaries were expected to need little additional on-the-job training. The most preferred worker characteristics were **good work habits and attitudes, interpersonal skills, specific job skills,** and **prior work experience.** The majority (57%) of all respondents indicated the need for computer training, from familiarity with and ability to operate computers (not how to program or repair them), to the use of CAD/CAM equipment, to general computer literacy. Although **basic academic skills** was ranked relatively low, many employers expressed the need for schools to teach the "basics" of reading, writing, math, reasoning, communication skills, and following instructions; and they were willing to do more of the job-specific training.

Wilms, Wellford W. "Vocational Education and Job Success: The Employer's View." Phi Delta Kappan 65.5 (1984): 347-350.

This study examined employers' views of desirable qualities for entry-level workers. Data were collected from 172 firms located in the Los Angeles, California, area. According to these employers, the most important factors to job success were good work habits and positive attitudes (63%), technical job skills (23%), and linguistic and computational abilities (14%). The survey found that recent technological changes have had little impact on the skills required for most entry-level jobs. About one-third (34%) preferred applicants with academic backgrounds, 17% favored vocational backgrounds, and almost half of the employers (49%) had no preference. More than two-thirds of the employers did most of their own training for entry-level jobs. To make workers more employable, employers suggested that schools should develop student pride and self-discipline and teach the basic skills. Wilms recommended that secondary vocational education should be reformed away from specific skills training (except for typing and the use of **microcomputers**) toward bridging the gap between theory and practice, that employer-based skills-training programs should be created, and that more attention should be paid to the needs of small firms for workers with specialized skills. The findings suggested that secondary vocational education programs are **not** meeting the needs of many U.S. employers.

SUMMARY

HOW ARE MICROCOMPUTERS BEING USED IN THE BUSINESS EDUCATION CLASSROOM?

Computing Equipment Used

The predominant brand of microcomputer for instructional use at the secondary level was Apple, followed by Radio Shack and Commodore. IBM ranked second in two studies (Lambrecht 14; Swadener and Jarrett 13).

Computer Availability and Utilization

Number of computers. The number of computers available for business education use varied significantly. Lambrecht reported high school business departments averaged 19 computers (85). Hertz reported that 68% of senior high school business education departments had microcomputers (44). Joint vocational schools had the most computers, 27 per business department; and exempted village schools had the least computers, 3 per business department (Harmon [April 1986] 294). Holder reported that 38 programs had from 2 to 4 computers, 27 programs had only one computer, 12 programs had 6 or more computers, and 15 programs had no computers available in the business education classroom (311). Conrad noted that most schools surveyed did not have computers in the business department (56).

Micro-intensity ratio (students-to-computer). Due in part to the variability in number of computers available for instructional use, the micro-intensity ratio varied significantly. Harmon (April 1986) reported a mean micro-intensity ratio of 66.76:1 for business education (296). Holder found that variability per course ranged from 5:1 to 50:1, and that the small rural business programs had the smaller ratios (312). In a national study,

Pepe et al. ranked Indiana 23rd for micro-intensity with 83.8 for all public schools and 71.6 for senior high schools (Appendix A). As much as student access time was related to micro-intensity, access time was also affected by the location of the computers.

Location of computers. Computers were located in central labs, departmental labs, and classrooms. More computers were housed in central labs than in academic departments (Rauch 6; Harmon [March 1986] 247). Parr and Miles reported that 49% of the computers were placed in computer labs (11). Within academic departments, business education ranked first, and math ranked second (Rauch 6; Harmon [March 1986] 247). Conrad's findings differed somewhat with Rauch's and Harmon's findings. Conrad reported that computers were located in the math or science departments (83). Within business education departments, computers were housed primarily in labs. Harmon (April 1986) found that more than half of the computers were located in labs and one-third in classrooms (295). Holder reported that 45% of the business teachers had a vocational lab (312).

Major curriculum area. The majority of studies indicated that math was the major curriculum area where computers were used to aid instruction (Anderson and Smith 5; Lucas 3; Parr 15). Becker, however, reported that computer literacy and programming were the major subjects for which computers were used in high schools, followed by business education and math ([June 1986] 5). Other areas or subjects where computers were frequently used included business/vocational education, computer science, and science (Barker 2; Lucas 3).

Microcomputer Instructional Applications

The microcomputer instructional applications were organized around the three categories of business microcomputer applications, business content taught using microcomputers, and teacher-management uses of the microcomputer. Some studies, however, did not differentiate among the categories of applications or categorized the applications in other ways. In summarizing these findings, the writer attempted to differentiate the applications where possible. It was believed that within the first two categories some overlap may have occurred.

Business microcomputer applications. Word processing was the predominant business microcomputer application taught (Harmon [1985] 84; Lambrecht 87). Harmon (1985) reported that word processing, keyboarding, and accounting were the most used microcomputer applications in business education; and payroll, taxes, and inventory were the least used (84). Other business applications frequently taught included BASIC programming, spreadsheet, and data base management (Lambrecht 88).

Business content taught using microcomputers. Accounting, keyboarding/typewriting, and word processing were the content areas most frequently taught using the computer (Harmon [1985] 84; Lambrecht 90). Other content areas taught using the computer included office procedures and data processing (Rauch 5). Lambrecht noted, however, that computers were used infrequently to teach content (89).

Anderson and Smith reported that by senior high "teaching **about** computers" and "problem solving with computers" were "educational applications" that were frequently or always used, and "instructing **with** a computer" was never or seldom used (7). Anderson and Smith's findings

supported Becker's statement that the high school class was most often a class **about** computers [object of instruction] rather than a class **using** computers as an instructional tool ([August 1986] 3).

Teacher-management uses of the microcomputer. The most frequently used teacher-management tools were word processing, spreadsheets, and grade book maintenance programs; and graphic displays or "slide shows" was the tool used by the fewest teachers (Lambrecht 91-92). For the most part, teachers used microcomputers infrequently as teacher-management tools (Lambrecht 91; Becker [1985] 8). Anderson and Smith found that the "educational applications" of "computer-managed instruction" and "using the computer as a teacher's aid" were never or seldom used (7).

WHAT ARE THE KNOWLEDGE, SKILL, AND ATTITUDES OF TEACHERS ABOUT MICROCOMPUTERS AND VARIOUS INSTRUCTIONAL COMPUTING ISSUES?

Teacher Knowledge

Overall, teachers were **not** well informed about any computer knowledge or skill area probed. The studies by Harmon ([May 1986] 343) and Holder (312) reported that teachers agreed for the need to seek additional knowledge concerning microcomputer instruction and its potentialities. Stevens (1982) found that although teachers indicated a lack of skills required to teach computer literacy or to use computers as instructional tools, they expressed a strong desire to acquire the computer knowledge necessary to meet the technological needs of students (12, 14). Yuen (1984) indicated that vocational teachers had a low level of knowledge about microcomputers (81).

Several studies reported on computer training; and from those studies, a low level of teacher knowledge about microcomputers may be inferred.

According to the National Education Association's (NEA) survey, 79.2% of all teachers had **not** been trained to use a computer (16). Goddard and Pereira-Mendoza showed that 80% of the teachers had **not** taken a computer course (16). Ingersoll et al. reported that teachers expressed the need for extensive training before they could effectively utilize this new technology (30-31). Stevens (1984) reported that 72% of the teachers surveyed expressed a need for computer training (265). Yuen (1986) found that 54% of vocational teachers had received some computer training and that they felt "somewhat informed" (4).

Teachers' attitudes toward the use of microcomputers were related to their understandings (knowledge) about microcomputers; and the better the teachers' understandings, the more favorable were their attitudes toward using microcomputers (Yuen [1984] 83).

Teacher Attitudes

Teacher attitudes were organized around the four categories of effects of computerization on education, effects of computer use on students, effects of computer use on teachers, and computing needs of teachers.

Effects of computerization on education. Teachers believed that microcomputers would most likely be involved in a number of educational changes. Teachers believed that there would be an increased demand for teachers with computer skills, that learning by computers in school would become common practice, and that computer skills would be regarded as a basic form of knowledge (NEA Report 55; Yuen [1986] 5). Teachers expected that computer usage in classrooms would increase significantly over the next 10-15 years, and that computers would have a strong impact on classroom instruction

and on the curriculum (Stevens [1984] 264). In the study by Norris and Lumsden, the majority of teachers agreed that computers were valuable tools that could be used to improve the quality of education (132).

Effects of computer use on students. The general attitude of teachers was that computers had impacted most on students' motivational aspects for learning rather than on academic achievement. In a national study by Becker (Nov. 1986), computer-using teachers reported "much improved" outcomes in student motivation, student cooperation and independence, and opportunities for high- and low-ability students (1). The outcomes with the least perceived improvement were individualization of assignments, diagnoses of students' learning problems, and learning in school subjects by average and above-average students (1). Becker found that learning outcomes were viewed most positively in schools which emphasized word-processing, and outcomes were stronger in schools with better student-to-computer ratios (14). Business education teachers indicated improvements in student writing because of computers (13). In addition to the motivational aspects, two studies reported that computers had a positive effect on cognitive learning (NEA Report 56; Yuen [1986] 4).

Effects of computer use on teachers. Although the general attitude of the majority of teachers toward computers was enthusiastic and postive, many teachers expressed concerns or reservations about using computers in their own classrooms. These findings were supported by Norris and Lumsden's finding that educators' attitudes were positive toward computers as long as the function of the computers was removed from their own classrooms (132). The majority of teachers felt that the use of computers as a teaching method would change their role, and most saw this change as unfavorable (Bliss et al. 51;

Elliott et al. 20). However, they anticipated that computers would cause little change in their classroom procedures, instructional strategies, or in the content taught (Stevens [1984] 265). Teachers were concerned about the confidentiality of and access to personal data, abuse of power, and anxieties and feelings of inadequacy toward the new technology (Bliss et al. 53). Additional concerns included cost, availability, appropriateness and quality of software, little opportunity for critical or creative thinking, may reduce employment opportunities, and lack of human contact between teacher and student (Ingersoll et al. 30).

The studies indicated a diversity of perceived advantages or benefits of microcomputer instruction. Among the advantages mentioned were useful visual aid for difficult concepts, statistical tool, means for reinforcing learning, motivational tool, and promotes individual learning (Bliss et al. 53). Several benefits were reported by Goddard and Pereira-Mendoza, including allow faster students to go ahead, maintain records, provide subject information, and increase student interest (16). Other benefits of microcomputer instruction were increased computer literacy and reduced apprehension (Harmon [May 1986] 343). Teachers were very positive that business education programs "should" be improved by the use of microcomputers; however, they were less positive as the statement became more restrictive (replacing "should" with "will") (Harmon [May 1986] 343).

Teachers viewed computers as having a positive effect on their professional development, teaching effectiveness, and job satisfaction (NEA Report 55; Yuen [1986] 5).

Computing needs of teachers. Three major obstacles in the implementation of computers were identified--lack of hardware, lack of quality software, and

lack of knowledgeable teachers (Stevens [1982] 14). These obstacles paralleled the computing needs of teachers. In general, the greatest computing needs among teachers were for computer knowledge and experience; and among computer-using teachers, the greatest needs were for software or coursewares, personal knowledge about computing, and more hardware (NEA Report To: Iuen [1986] 4).

WHAT ARE THE EMPLOYMENT NEEDS OF THE BUSINESS COMMUNITY IN COMPUTER AND RELATED OCCUPATIONS?

Employment Needs of the Business Community

Employment needs were organized around the four categories of basic academic skills, job skills, computer skills, and non-technical skills. Employer recommendations for training were also presented.

Basic academic skills. Basic academic skills were considered important by the majority of employers. Several studies emphasized the importance of written and oral communication skills (Barr and Fairchild 21; IBP Appendix A 6; Martin and Tolson 150; Stevenson and Bowers 4). Math, reasoning, and studying were also considered basic competencies (IBP Appendix A 6). In the study by Martin and Tolson, basic skills were expanded to include emphasis on reading, understanding, and applying technical materials (150). Two studies did **not** place as much importance on the basic academic skills. In the study by Stevenson and Bowers, basic skills were considered important "but only to the extent and in the form required to perform on the job" (4). "Basic academic skills" was **not** rated among the most important characteristics by employers in the South Carolina study (30). Employers reported that many

entry-level employees were lacking in basic skills (Ward and Wolff 8; South Carolina 31).

Job skills (technical skills). For computer and related business and office occupations, employers considered basic technical job skills important to job success (Wilms 348; Stevenson and Bowers 4). The basic technical skills of vocationally trained workers were considered "acceptable" by the majority of employers (Ward and Wolff 8; Owens 21). Most firms indicated they would train for job-specific skills (Ward and Wolff 8; Owens 25; Stevenson and Bowers 4).

A variety of core competencies were identified as important. Mott indicated employers wanted telephone communication, business English, and business math skills (95). For computer and related occupations, Barr and Fairchild reported that typing, records management, and information processing were "required" skills (6). Barr and Fairchild recommended that keyboarding/typing classes should be made available to all students (27). The basic job-related aptitudes of clerical perception, verbal ability, and numerical ability were considered important to administrative support jobs (IEF Appendix A 6).

Computer skills. Although computer use was widespread and growing rapidly, few workers needed extensive education or training in computer-related skills; and the computer skills in any occupation were only a small part of the total work skills (Goldstein and Fraser 1, 37). The study Intensive Business Program reported that computer literacy was identified by employers as a desirable **pre-employment** skill (Appendix A 7). Contrary to the IEF finding, Stevenson and Bowers reported that computer literacy was rated "company will train" by 40% of the employers and "not used on job" by 40% (5).

word processing was identified as one computer-related skill that schools were currently teaching effectively which could enhance a worker's employability (Goldstein and Fraser 22). Employers wanted employees with the requisite computer skills which would enable them to integrate the computer creatively and efficiently into their work (Martin and Tolson 150). Barr and Fairchild recommended that computer literacy, word processing, and computer-based accounting should be made a part of every business education program (29).

For specific computer skills, Mott revealed that the majority of employers required a "high" or "average" degree of proficiency for entry of data, manipulation of data, and knowledge of programs (56). She recommended that business educators teach general theory, concepts of computers and applications, not specific hardware and software; the specifics, she felt, could be taught on-the-job (27).

Word processing, accounting, spreadsheet, and payroll applications were the most frequent uses of computer applications by entry-level employees (Crowe 19). Lotus 1-2-3, dBase, WordStar, and Multiplan were the application software packages most often used (Crowe 17; Mott 58).

Non-technical skills. Several studies showed that a positive attitude and good work habits were the most important employee characteristics according to the majority of employers (Mott 61; Stevenson and Bowers 4; Wilms 348; IBE Appendix A 8). Interpersonal skills and employability skills were also rated important by a number of employers (Mott 61; Stevenson and Bowers 4; Barr and Fairchild 6, 21; Martin and Tolson 129-130). Martin and Tolson reported that reasoning, generalizing, adaptability, and flexibility skills were needed by employees to generalize their knowledge as broadly as possible (150). For computer and related occupations, Barr and Fairchild reported that

grooming and health were "required" skills (21). Stevenson and Bowers reported that more than half of the employers rated appearance and personal life skills as "advantageous" but not "essential" (4).

Employer recommendations for training. Several studies reported employers felt that business/vocational students needed additional training in basic skills, computer literacy, and work values (Owens 4; Ward and Wolff 9; Wilms 349; South Carolina 47-48). The employers felt that schools should provide training in these skills, and that employers should provide training in the specific technical skills to do the job (Owens 25; Stevenson and Bowers 6; South Carolina 53).

CONCLUSIONS

The research showed that microcomputers were being used in a variety of ways in the business education classroom. Microcomputer availability and usage varied with grade range, school enrollment, poverty level, per pupil expenditures, metro class, micro-intensity, and location of computers. Apple microcomputers were the most widely used microcomputer in secondary schools for instructional use. The number of microcomputers available for business education use varied significantly. Many schools had no microcomputers available for business education use, and others reported more than two dozen microcomputers per business department.

High micro-intensity ratios (students-to-computer) and inequities in access influenced student access time and reduced the effective use of computers by students. Micro-intensity ratios varied substantially, with business education departments having the higher ratios than secondary schools overall. Computers were housed in central labs, departmental labs, and classrooms. Within academic departments, computers were located primarily in business education or math departments. And within business departments, more computers were located in labs than in classrooms. Math was the major curriculum area where computers were used to aid instruction. If computers are to be used effectively by students, micro-intensity must be reduced to allow greater student access time, and the issue of equity in access must also be resolved.

The studies revealed business education teachers were incorporating microcomputer applications into their curricula. Word processing was the predominant business microcomputer application taught. Accounting,

keyboarding/typewriting, and word processing were the content areas most frequently taught using microcomputers. The most frequently used teacher-management tools were word processing and spreadsheets. Most teachers, however, did not use microcomputers to teach content or as a teacher-management tool.

Despite initial reservations, teachers' reactions to the infusion of microcomputers in business education curricula tended for the most part to be favorable. Although teachers were not well informed about computers, their attitudes were generally positive toward the use of microcomputers in the classroom. Teachers perceived that microcomputers would strongly influence classroom instruction and the curriculum but not in their classrooms. At this time, teachers felt computers had impacted more on student motivation than on academic achievement. Although the general attitude of teachers toward computers was enthusiastic and positive, many teachers expressed worries or concerns. They expressed feelings of anxiety and inadequacy toward the new technology. They were concerned about the appropriateness and quality of software. Others felt computers offered few opportunities for critical or creative thinking by the students. The greatest computing needs among teachers were for software, computer knowledge, and hardware.

Positive attitudes and good work habits were the most important employee characteristics according to the majority of employers. With the exception of a small percentage of workers who needed extensive computer education and training, most workers used computers as tools in their jobs. Generally, employers wanted good, solid workers who were trained in basic academic skills and computer literacy. Employers were less concerned with specific job skills

training beyond a minimum basic level of competency. Many employers indicated they would train for the job-specific skills.

Based on the results of these studies, most secondary business education programs were teaching the technological skills that would enable students to secure entry-level computer-oriented jobs in today's businesses. Specific areas of agreement included the following. Businesses were using computers; schools were offering computer-related courses. Businesses used programming languages; schools were teaching programming. Businesses used a variety of software; schools were teaching various software packages. Areas of disagreement included the following. Most businesses used COBOL; most schools taught BASIC programming. Most businesses used IBM computers; most secondary schools used Apple computers. Cooperative efforts between the private sector and the education community need to be increased in order to provide the most relevant education for employment possible.

RECOMMENDATIONS

On the basis of the findings of these studies, the following recommendations are offered.

1. Business educators should contact local employers on a regular, organized basis so they may provide input on new trends or procedures occurring in the actual office environment. This may be accomplished through the establishment of an employer/school advisory committee for business education curriculum development.

2. Business education teachers should be given opportunities to update their knowledge and skills in actual office settings.

3. More IBM and compatible computers should be made available for business education use.

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